CHAPTER 2

PROJECT DEVELOPMENT

2.1 Project Development Process

DDOT projects are developed and executed through the following steps:

- Planning
- Prioritization and budgeting
- Project programming
- Preliminary design
- Final design
- Bid process
- Construction
- As-Built Plans

Although specific tasks may vary from project to project, the general tasks and requirements remain consistent (Refer to the Appendices at the end of this manual for the Project Development Process Flow-chart).

2.1.1 Step 1 - Planning

Planning is the first step in the project development process. This step generally includes planning document research, data collection, problem assessment, identification of deficiencies, and feasibility studies. Other tasks in this step may include development of a problem statement, defining project purpose and goals, identification of key stakeholders, partners and project team members, determining project limiting factors and constraints, and preparation of a budget estimate. Please see the following information on project identification:

- Project Identification - Potential Sources of Projects:
    - Pavement Index
    - DDOT Traffic Improvement Studies
    - High Accident Locations and Traffic Related Problems
    - Strategic Transportation Plan
    - Strategic Neighborhood Action Plans (SNAP)
    - Capital Budget
    - Transportation Improvement Plan
    - DC Government Agency Requests
    - Advisory Neighborhood Commission Requests
    - Metro Bus Requests
    - Other Sources

- Project Identification Process:

    - Complete a Project Description Form for each proposed capital project, including a preliminary description of the project, including location and key issues and neighborhood contacts (See Attachment # 1).
    - Compile and maintain a list of all projects proposed in the Ward.
    - Prioritize projects by fiscal year, indicating when all compliance documents should be completed and the project is ready for the design phase and review with team leader.
    - Consult with Project Team Leader of project status on a monthly basis.
    - Circulate project list and project descriptions semi-annually to Advisory Neighborhood Commissions and other stakeholders.

- Project Scoping and Resource Allocation:

    - Meet with project sponsors and stakeholders to clarify project description and identify project needs and key implementation issues.
    - Coordinate with Project Team Leader to determine if any other projects in the Ward impact the proposed project.
    - Modify project description to incorporate comments and circulate to stakeholders for concurrence.
    - Coordinate project description with Traffic Services Administration and Infrastructure Project Management Administration (IPMA) for review and comment.
    - If needed, conduct transportation study to clarify project needs and requirements:
        - Select contractor from list of pre-approved contractors
        - Negotiate Scope of Work
        - Obtain FHWA approval (if using federal funds)
        - Coordinate with stakeholders including DDOT Administrations
        - Conduct Study with public review and comment meetings
        - Complete report
    - Identify funding requirements for design, construction and construction management and identify potential federal and/or local funding sources.
    - Verify with the TPPA Resource Allocation Officer of the availability of federal and/or local funding sources.
    - Assess the proposed project using the Project Evaluation Criteria (see Attachment #2) to establish project priority ranking and

recommend appropriate fiscal years for project design and construction.
- Notify the DDOT Public Space Management Administration of the proposed project to coordinate with underground utilities.
- Advise Project Team Leader of project status on a monthly basis and obtain confirmation of proposed design and construction schedule.
- Circulate project list and project descriptions semi-annually to Advisory Neighborhood Commissions and other stakeholders.

- Project Approvals:

  - Identify federal and/or local environmental approval requirements (CE/FONSI/EA/EIS) and verify with DDOT Environmental Compliance Officer.
  - Identify historic preservation and other compliance requirements (storm water and erosion control permits, land acquisition, etc.)
  - Identify any federal or local agencies that will need to review and approve the project (NCPC, Fine Arts Comm., Architect of the Capitol, SHPO, etc.)
  - Develop scope of work and assign environmental and other compliance reports to task order contractor.
  - Coordinate scope of work and compliance report process with stakeholders.
  - Coordinate project with Traffic Services Administration and Infrastructure Project Management Administration.
  - Submit draft compliance reports to appropriate federal and local agencies for review and approval.
  - Advise Project Team Leader of project status on a monthly basis and obtain final approval for project design.
  - Circulate project list and project descriptions with compliance status report semi-annually to Advisory Neighborhood Commissions and other stakeholders.

NOTE: Please see following Attachments:

Attachment #1

Project Description Form

Project Name: _____ Team # _____

Project Status: ID SF PA

Project Sponsor: _____

Project Priority: H M L

Project Location: _____

Project Description:

Stakeholders:

Key Issues:

Project Status
Checklist

Project
Name: _____
Date: _____

Project
Location:
_____

TASK MILESTONES A. Project Identification	Start Date	End Date	Status	Comments
Prepare project description including location.				
Prepare list of stakeholders.				
Prepare Project Description Form (attachment 1).				
Prepare Preliminary Project Priority and Schedule.				
Advise Team Leader of project.				

Project Status
Checklist

Project
Name: _____

Date: _____

Project
Location:
_____

TASK MILESTONES B. Project Scoping and Financing	Start Date	End Date	Status	Comments
Meet with stakeholders to confirm project description and location				
Coordinate with Team Leader.				
Modify project description and circulate to stakeholders for verification.				
Identify funding requirements for design, construction and construction management, and identify potential sources of funding.				
Verify funding availability with OCFO.				
Prioritize project using Project Evaluation Criteria (attachment #2).				
Recommend proposed fiscal years for design and construction.				
Prepare PAR and 106 forms to obligate funding.				
Notify DDOT Public Space Management Admin. of pending project to coordinate utility work.				

Project Status
Checklist

Project
Name: _____
Date: _____

Project
Location:
_____

TASK MILESTONES C. Project Approvals	Start Date	End Date	Status	Comments
Identify Required Approvals (as necessary)				
Federal environmental clearance (CE,FONSI, EA, EIS)				
4(f) Approval				
Local environmental clearance (environmental screening form)				
Historic Preservation Approval (SHPO)				
NCPC Approval				
Fine Arts Commission Approval.				
Architect of the Capitol				
Prepare draft scope of work for required compliance reports.				
Coordinate compliance report draft scope of work with Advisory Neighborhood Commissions and stakeholders.				
Assign compliance report to contractor.				
Coordinate draft compliance report with ANC and stakeholders.				
Submit compliance report to review agency.				

2.1.2 Step 2 - Prioritization and Budgeting

Prioritization and Budgeting follows the planning step of the project development process. This step generally includes an assessment of the following: funding resources, prioritization of the project relative to other District needs, initial assessment of ROW needs, identification of environmental clearance requirements, development and initiation of the community involvement process, and proposing for inclusion in the District's budget submission. Below are the steps involved and a sample time frame as a guide:

- Infrastructure Project Management Administration's (IPMA) Asset Management Division develops an initial draft of proposed locations for all funding sources from Pavement Condition Index and Bridge Condition reports, Transportation Policy and Planning Administration's (TPPA) planning studies and community requests, Public Space Management Administration's (PSMA) restoration plan, Traffic Services Administration's (TSA) safety, signal, and lighting program and Urban Forestry Administration's (UFA) streetscape program - June.
- Ward Planners (community work and SNAP Plans) and Team Leaders (field verification of condition) and the Transportation Policy and Planning Administration (TPPA) concurrently review the Initial List - July.
- Draft of DDOT's 6-year plan is shared with utility companies - August.
- IPMA/TPPA/TSA/PSMA/UFA prepare budget documents Program Action Requests (PARs, 106 forms and project descriptions) to be transmitted to the Office of Chief Finance Officer (OCFO) for assembly into FY budget request, copy sent to TPPA (Budget Coordinator) for review and coordination. August - September.
- Official budget from downtown OCFO call comes in October. DDOT, OCFO make final adjustments based on budget instructions - October.
- OCFO review and coordination of DDOT budget with other citywide budget needs – November/December.
- Current all funds 6 year plan goes to Mayor for transmittal to Council with budget - January.
- Budget approved - March/April.
- Streets in current year allocated to funding source by OCFO and TPPA/IPMA Resource Allocation Officers (Budget Coordinators). Team Leaders to begin environmental and communication of program to neighborhoods by TPPA and Preliminary Engineering (PE) by IPMA.
- PE obligation and design (neighborhood interaction and coordination with TPPA/TSA/PSMA/UFA/ OCFO continue to pick up projects by others).

2.1.3 Step 3 - Project Programming

This step generally includes the following: development of final scope, identification of major and minor projects, obligation of funds for preliminary engineering, and plan for design and construction. The design consultant selection usually occurs prior to project programming of funds. The consultant contract agreements are competed after the funds are secured.

2.1.4 Step 4 - Preliminary Design

Upon obligation of funds for preliminary engineering, the project proceeds to the preliminary design step, including completion of consultant agreements. The purpose of preliminary design is to develop the design of the project to a level of detail needed to support the environmental approval process, preliminary utility involvement and the community involvement process.

The plan must contain **Context Sensitive Design (CSD)** values, which includes being in harmony with respect to cultural characteristics, aesthetics, community values, social needs, natural environment and transportation needs. See **Context Sensitive Design Guidelines,** Appendix H (Chapter 48).

Preliminary Design generally includes the following: field survey, collection of necessary traffic and geotechnical data study of design alternatives, development of preliminary plans for selected alternatives, utility information and discussions, making design efforts for meeting the standards without any need of design exceptions, environmental approval process, project specific community involvement, initial cost estimate, and 30% preliminary design review. At the conclusion of preliminary design, the project must be approved by DDOT to proceed with continuation of design.

NOTE: The findings, issues, or deficiencies shall be noted via letter to the Consultant or via memos to the DDOT Project Manager.

2.1.5 Step 5 - Final Design

The final design step involves producing the construction drawings, details, and specifications necessary to bid and construct the project. This step generally includes the following: 65% intermediate design review, 100% final design review, Right of Way (ROW) clearance, utility clearances, environmental clearances, final cost estimates, and wrap up of community involvement. At the conclusion of final design, obligation of funds for construction is required for the project to move forward to the bid process.

2.1.6 Step 6 - Bid Process

The bid process for DDOT projects is managed by the Contracting and Procurement Office (OCP). The Project Manager's role in the process is to provide technical support in response to bidder questions, input for bid document addenda, and technical evaluation of bid submittals.

2.1.7 Step 7 - Construction

The Program Manager is responsible for construction management for construction and close out of projects in his/her ward area, including approval of shop and working drawings. The **District of Columbia, Department of Transportation Standard Specifications for Highways and Structures**, including modifications to these specifications, will be used for construction in the District.

2.2 Project Roles and Responsibilities

Numerous divisions, local, regional, and federal agencies are involved in the planning review and design of DDOT projects. Refer to the Appendices at the end of this manual for persons/divisions that may participate in each project.

2.3 Project Design Requirements

2.3.1 General

The general scope of work for project design consists of design, structural analysis, plan preparation, special provisions, cost estimates and bid documents for road reconstruction, upgrading, resurfacing and bridge construction and repair. This includes provisions for curb ramps, streetlights upgrades, traffic signal installation and replacement, sidewalk repair/replacement, curb and gutter repair and replacement, drainage improvements, and tree trimming, planting and/or replacement.

All project design must comply with current design practices and requirements of the following: DDOT, applicable requirements of the **Federal Highway Administration (FHWA), American Association of State Highway and Transportation Officials (AASHTO), A Policy on Geometric Design of Highways and Streets (latest edition), AASHTO Standard Specifications for Highway Bridges (latest edition), AASHTO Guide for Design of Pavement Structures (latest edition)**, and the District of Columbia, Standard Specifications for Highways and Bridges. Safety practices and requirements must meet the MUTCD, latest edition.

Incorporate the applicable District's standard details, which are available from the Department on electronic files, into full-scale project plans. When

full-scale project plans are not developed, include the applicable standard details with the contract special provisions and documents.

Prior to any work occurring, the Project Manager must verify if the facilities are historic, located in historic districts, or require special treatment.

The design Project Manager/Consultant will coordinate with various offices to identify and respond to their requirements. They will be responsible for seeking timely and relevant input from the various offices and incorporating their responses into the project design. The design Project Manager/consultant will keep the Program Manager informed on all dealings with various offices and utility companies and any schedule impacts related to their input.

2.3.2 Field Survey and Mapping

Perform field surveys/mapping and prepare plans to complement the assigned specific highway and/or bridge design project as well as other engineering tasks as may be required, including but not limited to:

- Topography - Prepare all field surveys required for mapping and referencing within the established project limits. Locate existing streets/bridge, trees, walls, steps, and street level utility appurtenances including manholes, ROW lines, building restriction lines, existing topography under and outsides of the bridge structures and other physical and legal features within the limits of the project.
- Topographical Map - Use a topographical map to show property ties, stations, elevations and controls.
- Cross Sections - Develop cross sections at 50 ft. intervals for the existing streets/highway and bridges along center lines, quarter points, flow lines, tops of curbs, edges of sidewalks, and steps, providing full coverage of the area within the limits of the project.
- Horizontal Control - Furnish horizontal control in the State Plane Coordinate System of the State of Maryland unless otherwise directed.
- Traverse points - Perform a series of conventional horizontal control (the State Plane Coordinate System of the State of Maryland and vertical control (D.C Datum) traverses for each street and highway project unless directed otherwise by the Project Manager. The traverse will consist of permanent points set in stable material that will not be disturbed during the course of construction. Tie each traverse point to a minimum of three permanent structures to assist in future recovery.
- Global Positioning - Use Global Positioning System (GPS) equipment to transfer controls to a project street/highway and bridge that is not within two thousand (2,000) ft. of an existing control.
- Survey Permission - Permits to perform field survey are not required, except from the National Park Service. Notify in writing the Project

Manager and the adjoining property owners and communities prior to commencing the survey work.

- Survey limits - The width of the survey limits for each street will be from ROW line to ROW line where it can be easily determined. In areas where a ROW line can only be determined by performing a boundary survey, the survey limits for the street will be from the back of the existing sidewalk to the back of existing sidewalk. If additional information is required beyond the ROW line, the District will seek permission from the private property owner (in writing) prior to commencement of any work.
- Final Plans - Incorporate all information into the final contract plans including the utility maps and cross section drawings.

2.3.3 Utility Maps

Obtain existing utility information from utility records from the Department's Office of Public Space located at 441 North Capitol Street, Washington, D.C. Compilation of such information onto the utility maps is the responsibility of the Consultant. Store such information in Micro station CADD and show on the preliminary plans, after resolving any discrepancies. At each submission, deliver to the various utility companies the completed utility compilation maps for confirmation and correction. Make any changes to the utility maps resulting from the reviews and coordination with utility companies.

Prepare composite utilities drawings showing all above ground proposed roadway features between the ROW lines such as curb lines, sidewalks, curb ramps, trees, fire hydrants etc. Show all underground existing and proposed utilities, including electrical conduits, communication line, sewer and water line and all other utility appurtenances including catch basins, manholes, legends and notes, and ensure that they do not conflict.

NOTE: Utility test pits may be required to determine the field location of utilities in certain circumstances during the design process. Provisions for the test pits, however, should be included as part of the original contract.

2.3.4 Geotechnical Services

Perform geotechnical services and prepare plans. Perform soil borings, boring logs, test cores, laboratory tests, analyses and recommendations for appropriate action. Perform geotechnical services to complement the specific highway and/or bridge design project.

2.3.5 Traffic Control Plans

Prepare maintenance of traffic, detour, and construction sequence plans. Include all necessary maintenance and protection of traffic features beyond

the limits of actual reconstruction. For such plans and any other traffic-related design required for this Project, meet with Traffic Services Administration (TSA) staff prior to starting design, and work closely with TSA throughout the entire design process.

Identify needs for temporary use of lands to accomplish traffic detours, work and storage needs, mobilization/ demobilization, etc., and identify needs for temporary relocation of roadside facilities. Show on the plans any required temporary construction for maintaining traffic. Show appropriate safety appurtenances to all phases of construction and traffic, including existing signing and proposed traffic control signing. Develop plans in sufficient detail to establish cost estimates for vehicular traffic maintenance.

2.3.6 Electrical Work

2.3.6.1 General

Work to be performed is categorized into traffic signal, streetlight, and communications design to complement the rehabilitation or reconstruction of street and bridge projects. Include Streetlight and Traffic Signal designs in the project scope of work. Perform traffic signal and streetlight designs by the same consultant or sub-consultant for the entire assigned project or tasks.

Conduct a field review of the site to verify existing conditions and features, which affect streetlight and traffic signal designs. Determine the extent and type of replacement or construction from the findings during the field review on the upgrading of the streetlights and traffic signals.

Incorporate the streetlight and traffic signal plans, specifications and cost estimate into the contract plans, specifications and cost estimates. Include necessary paving details for restoration of work areas.

Develop base maps from the composite utilities drawings showing all above ground proposed roadway features such as curb lines, sidewalks, curb ramps, storm catch basins, trees, fire hydrants etc. between the ROW lines, including all underground utilities in close proximity and/or crossing any existing or proposed streetlight and traffic signal conduits, manholes, foundations or direct buried cable. Indicate wood poles and distribution, and secondary routing on the drawings for those areas of the city, which do not have underground electrical service.

Coordinate and consolidate contract plans, special provisions, quantities and pay items for streetlight, traffic signal and communication work. Prepare detailed construction cost estimates for

electrical work in a format approved by the Department, including all back chargeable or reimbursable costs allowed for Gas Company, Telephone Company and PEPCO work.

Electrical Engineers will be required to prepare any electrical drawings (including lighting).

Deliver final drawings, sequences of operations, timing sheets, and engineer's cost estimates and MicroStation CADD files and computer discs to Traffic Services Administration (TSA) pertaining to electrical work containing any information pertinent to the final submittal in an agreed upon format.

2.3.6.2 Traffic Signal Design

Upon approval of the preliminary plans by the District and FHWA, prepare complete and detailed contract plans, specifications with Pay Item Schedule, and construction cost estimates for a complete job.

Prepare traffic signal plans for each detour stage, if applicable, and for the final traffic signal work. Each set of plans will contain proposed roadway features between the ROW lines, specific features such as, cable schematics, the locations of all existing and proposed underground utilities, legends and notes and all dimensioning and details necessary for the proposed traffic signal construction.

NOTE: A complete traffic signal sequence of operation and proposed signal timing plan is to accompany each drawing. A detailed engineer's cost estimate showing quantities is to also accompany each drawing.

2.3.6.3 Street Lighting Design

Upon approval of the preliminary plans by the District and FHWA, prepare complete and detailed contract plans, specifications with Pay Item Schedule, and construction cost estimates for a complete job.

Prepare streetlight plans indicating locations, pole and luminary types, conduits, manholes, ROW lines, legends and notes. Each set of plans will contain proposed roadway features between the ROW lines, locations of all existing and proposed underground utilities, proposed sequence of construction, and all dimensioning and details necessary for the proposed streetlight construction.

NOTE: A detailed engineer's cost estimate showing quantities is to accompany each drawing.

2.3.6.4 Communications Design

Develop preliminary design and computation for duct banks to be installed across the street/ highway between controllers required for the communication. Incorporate plans, specifications and cost estimates.

2.3.7 Storm Sewers

WASA has the responsibility to evaluate the capacity, design and construction of the main line storm sewers, separate storm water from sanitary sewer and extension lines, including manholes. For street designs in the private development, the private developers will be responsible for designing and constructing the storm water sewer system for approval from WASA. Project Design Engineer/DDOT will be responsible for adding inlets and lateral piping from inlets to manholes to accommodate drainage from the roadway for the District's projects. These improvements must meet the requirements of WASA's standards.

Connect catch basins to existing storm sewer lines with basin connecting pipes (minimum size 15 in. diameter). No profile will be required for the connecting pipes for the District projects. The design must conform to the applicable District of Columbia storm drainage criteria for improving the storm water quality.

NOTE: WASA may request design and construction of their storm sewer improvements through the DDOT consultant, or other consultants as necessary to incorporate their work, and then reimburse the cost to DDOT.

2.3.8 Water, Sewer and Utilities

The plans must show all the locations of all the underground utilities (the compilation). When all of the underground utilities are located, the plans are sent to each utility owner involved for verification of alignment and depth. The plans should be sent to each utility owner for review through the DDOT Project Manager. Replies from the utilities should be sent to the DDOT Project Manager and forwarded to the Designer/Consultant and revisions made accordingly. Coordination with regard to utility improvements, are to be coordinated with WASA, PEPCO, and other utilities involved. The utility companies will review the plans in each of the planned submission.

Incorporate relocation of fire hydrants and associated tasks where existing fire hydrants are impacted due to roadway construction or as directed. Design work for utilities, such as water mains and sanitary sewers, is excluded from the scope of work unless directed otherwise; however,

incorporate the designs by others into the project and coordinate the work with the utilities.
NOTE: WASA and utility companies may request design and construction of their improvements through DDOT and then reimburse the cost to DDOT.

2.3.9 Landscaping

Landscaping generally includes trimming and/or removal of existing trees, planting new trees, sodding and minor grading for areas within the ROW. Prepare general landscape plans, estimates and specifications. Visit each site and make every effort to save existing healthy trees by adjusting horizontal and vertical grades near mature trees. The proposed top of curb elevations should not exceed 2 in. above or below the existing elevations near live mature trees.

2.3.10 Soil Erosion and Sediment Control

Prepare plans, drawings, details, estimates and specifications for control of soil erosion and sedimentation during construction in accordance with current guidelines for erosion and sediment control of the District of Columbia Department of Health, Environmental Health Administration, Watershed Protection Division.

2.3.11 Submittals

2.3.11.1 Preliminary Plan Submittal – 30% Review

Perform all tasks necessary before 30% review submission for road and bridge projects including but not limited to the following procedures. Also, the Consultant shall arrange a field review with DDOT and FHWA representatives to insure project concurrence.

- Determine all historic structures, historic neighborhoods, or other requirements to this project and coordinate with Historic Preservation.
- Provide traffic-engineering enhancements intended to improve spot safety, eliminate hazards and comply with basic design criteria and requirements in the project limits. Attend meetings with personnel from various traffic divisions within the Traffic Services Administration (TSA) to resolve any conflicts.
- Obtain and review any existing or proposed Signs and Markings, and safety improvement designs from the TSA. These designs, if still applicable, should be incorporated into the new design.
- Determine if geometric changes are warranted to alleviate potential safety or operation problems and to satisfy AASHTO requirements for design speed, horizontal and vertical curvature

and capacity criteria. If geometric changes are proposed, prepare drawings showing the proposed changes.

- Determine if roadway warrants widening, especially if the roadway travel lane widths are substandard. If widening is proposed, determine if ROW is available and if trees need to be cut.
- Determine the need for safety appurtenances (guiderail, impact attenuators, etc.).
- Provide horizontal and vertical curvature (profile, high and low points, maximum grade and sight distance, etc) for conformance with AASHTO and DDOT requirements.
- Provide design data (current and projected traffic volumes, percent trucks, directional distribution, etc).
- Indicate a proper scale, format, title block, legends, notes and a North Arrow on drawings. The horizontal scale for the plan sheets will be 1"=20 ft. unless otherwise directed.
- Include all detour routes, traffic control signs and markings, peak hour restriction, staging and construction sequence requirements in the Maintenance of Traffic Plan (MOT). Forward any requirements for signal design and signal timing variation for construction projects to the Traffic Signal System Division (TSSD) in TSA within a pre-determined time frame to allow proper response.
- Determine if bus operations are involved and if the buses can make the necessary turns. Inform the Project Manager immediately if any bus operation will be potentially affected and coordinate with Metro Bus Operation through the Office of Mass Transit to determine a solution.
- Determine if bike lanes are proposed. Inform the Project Manager immediately if any bike lanes are involved and coordinate with the Department's Bike coordinator to determine a solution.
- Whenever possible, curb ramps should be parallel to and aligned with the far side crosswalk line (the line farthest from the intersection).
- Consider Low-Impact Development solutions to storm-water. Incorporate latest approved design for water quality structures.
- Perform field reconnaissance and an evaluation of the structural condition of the bridge using the latest NBI Bridge Inspection Report as a guide.
- Perform seismic studies as required under AASHTO guidelines, and incorporate the findings in the design of the structures.
- Upon completion of the field inspection and seismic studies, prepare a brief report describing the findings, particularly the structural deficiencies encountered, and proposed recommendations for corrective action. Provide a bridge analysis and rating for the HS20 AASHTO standard loading (for NHS or

heavily traveled roads DDOT may require HS-25), including associated cost analysis to achieve HS20 AASHTO standard loading. Include Inventory and Operating load ratings in the computations based on the Load Factor method for the bridge in accordance with the National Bridge Inspection Standards (NBIS). Provide five copies of the said report to:

Program Manager
Infrastructure Project Management Administration
D. C. Department of Transportation
64 New York Avenue, N.E., First Floor
Washington, D.C. 20002

- Determine the extent of bridge rehabilitation or reconstruction and prepare drawings showing plans, elevations and the existing and proposed sections of the bridge, including all related structures and roadways affected from the proposed construction.
- Provide pre-design report details, design issues, resolution reports, status of project, and other relevant information.
- Provide a preliminary cost estimate with a 20% contingency to be used in determining the project budget.
- E-mail or submit the required sets of half-size of rubber-stamp dated preliminary plans and two copies of preliminary construction cost estimates for review and comments when directed, from which two sets of plans will be forwarded to FHWA for review and approval. Include cost of temporary construction, maintenance and protection of traffic, etc. in cost estimates for construction.
- Distribute the plans and special provisions as directed by the Program Manager. The Program Manager will furnish the addresses of the agencies and the specified number of plans to deliver.
- A Preliminary Project Review (PPR) may be scheduled 2-3 weeks after submittal of the plans to provide an opportunity to discuss changes.

NOTE: The preliminary plans for this submittal will include drawing sheets marked with (*) but not are limited to the following:

2.3.11.1.1 General Drawings

- Title Sheet *
- General Notes*
- Standard Symbols & Abbreviation/Summary of Pay Items and Quantities

2.3.11.1.2 Street/Roadway Drawings

- Existing Survey Plan*
- Geometric Layout and Control Points*
- General Roadway and bridge Plan*
- Roadway and bridge Paving Plan
- Existing and Proposed Roadway Typical Sections*
- Roadway Profiles- Centerline and Top of Curbs*
- Roadway Cross Sections
- Roadway Intersection Plan and Joint Layout
- Roadway Details- Joint Details, Alley & Driveways Entrances and Sidewalks
- Roadway Miscellaneous Details- Curbs & Gutters, Islands and Curb/Bike Ramps

2.3.11.1.3 Bridge Drawings

- Bridge Plan and Elevation*
- Bridge Deck and Approach Slabs Plan*
- Existing and Proposed Bridge Typical Sections*
- Bridge Framing Plan*
- Steel/Concrete Structural Details
- Bridge Bearing Shoes and Structural Details
- Bridge Joint Details
- Abutments Plan, Elevation, Footing/Foundation and Section
- Retaining Walls Plan, Elevation, Footing/Foundation and Section
- Piers Plan, Elevation, Footing/Foundation and Section
- Bridge Railing Plan
- Bridge Railing Details*
- Bridge Drainage Details*
- Bridge Repair Details

2.3.11.1.4 Utility Drawings

- Existing Utilities Plan, Legend and Notes*
- Composite Utilities Plan, Legend and Notes
- Proposed Storm Water Plan*
- Proposed Storm Water Sewer Profiles
- Storm Water Structures
- Proposed Water Main Plan*(Design by others)
- Water Main Details (Design by others)

2.3.11.1.5 Tree and Landscape Drawings

- Trees and Landscape Plan and Schedule of Quantities
- Planting Plans and Details

2.3.11.1.6 Electrical Drawings

- Streetlight Plan and Schedule of Quantities *
- Traffic Signal Plan and Schedule of Quantities
- Communication cables Plan and Schedule of Quantities
- Streetlight, Traffic Signal and Communication cables Details

2.3.11.1.7 Maintenance of Traffic Drawings

- Traffic Detour and Traffic Control Plan*
- Sequence of Construction Plan and Schedule of Quantities
- Proposed Signs and Pavement Marking Plan *
- Proposed Sign Schedule and Quantities
- Sign Support Details
- Pavement Marking Quantities and Details

2.3.11.1.8 Miscellaneous Drawings

- Sediment and Erosion Control Management Plan
- Sediment and Erosion Control Details and Notes *
- Soils Boring Logs*

2.3.11.2 Intermediate Plan Submittal – 65% Review

This review will occur while the Consultant continues the design of the project during the review. It is at this time that the Consultant shall arrange a field meeting with DDOT and FHWA representatives to insure that everyone is in agreement with all aspects of the project design. The 65% review submission for road and bridge projects include, but not limited to the following procedures:

- Address the comments from the 30% plan review.
- Develop detailed construction plans for the project in the final format, including TCP, signing and marking drawings for compliance with the MUTCD, District policy and the restrictions established for the project, Pay Items and schedule of quantities.
- Prepare the Special Provisions, including the scope of work for the project, specifications and Pay Items for the materials in the

final format. These items include work that modifies the Red Book specs.

- Prepare cost estimates in the approved format - This format will eliminate the contingency and be priced by the appropriate Pay Items listed as the quantities on the plans.
- Incorporate design plans, specifications, Pay Items and cost estimates by others when directed.
- E-mail or submit thirty sets of half-size of rubber-stamp dated intermediate plans for review and comments when directed, from which two sets of intermediate plans will be forwarded to FHWA for review and approval. Distribute the plans and special provisions as directed by the Project Manager. The Project Manager will furnish the addresses of the agencies and the specified number of plans and special provisions. Return the review comment list (30 percent) with plans showing items were addressed.
- Furnish 2 copies of updated itemized cost estimates at the time of this submission. The following sheets will be substantially completed and submitted in the following order:

2.3.11.2.1 General Drawings

- Title Sheet
- General Notes
- Standard Symbols & Abbreviations/Summary of Pay Items and Quantities

2.3.11.2.2 Street/Roadway Drawings

- Existing Survey Plan
- Geometric Layout and Control Points
- General Roadway and bridge Plan
- Roadway and bridge Paving Plan
- Existing and Proposed Roadway Typical Sections
- Roadway Profiles- Centerline and Top of Curbs
- Roadway Cross Sections
- Roadway Intersection Plan and Joint Layout
- Roadway Details- Joint Details, Alley & Driveways Entrances and Sidewalks
- Roadway Miscellaneous Details- Curbs & Gutters, islands and Curb/Bike Ramps

2.3.11.2.3 Bridge Drawings

- Bridge Plan and Elevation

- Bridge Deck and Approach Slabs Plan
- Existing and Proposed Bridge Typical Sections Bridge Framing Plan
- Steel/Concrete Structural Details
- Bridge Bearing Shoes and Structural Details
- Bridge Joint Details
- Abutments Plan, Elevation, Footing/Foundation and Section
- Retaining Walls Plan, Elevation, Footing/Foundation and Section
- Piers Plan, Elevation, Footing/Foundation and Section
- Bridge Railing Plan
- Bridge Railing Details
- Bridge Drainage Details
- Bridge Repair Details

2.3.11.2.4 Utility Drawings

- Existing Utilities Plan, Legend and Notes
- Composite Utilities Plan, Legend and Notes
- Proposed Storm Water Plan
- Proposed Storm Water Sewer Profiles
- Storm Water Structures
- Proposed Water Main Plan (Design by others)
- Water Main Details (Design by others)

2.3.11.2.5 Tree and Landscape Drawings

- Trees and Landscape Plan and Schedule of Quantities
- Planting Plans and Details

2.3.11.2.6 Electrical Drawings

- Streetlight Plan and Schedule of Quantities
- Traffic Signal Plan and Schedule of Quantities
- Communication cables Plan and Schedule of Quantities
- Streetlight, Traffic Signal and Communication cables Details

2.3.11.2.7 Maintenance of Traffic Drawings

- Traffic Detour and Traffic Control Plan
- Sequence of Construction Plan and Schedule of Quantities
- Existing Signs and Sign Schedule of Quantities

- Proposed Signs and Sign Schedule of Quantities
- Sign Support Details
- Pavement and Crosswalk Marking Plan and Schedule of Quantities

2.3.11.2.8 Miscellaneous Drawings

- Sediment and Erosion Control Management Plan
- Sediment and Erosion Control Details and Notes
- Soils Boring Logs

2.3.11.3 Final Construction Plans, Specifications, and Cost Estimates – Final Review:

The Consultant shall conduct a final field review with DDOT and FHWA personnel to insure everyone is in agreement with all aspects of the design and provide the following:

- Incorporate comments from the intermediate plans by the District and FHWA, prepare complete and detailed contract plans, specifications, Pay Item Schedule and construction cost estimates for a complete job, including sequence of construction, detour layout, and maintenance of highway and pedestrian traffic. Incorporate standard contract provisions and appropriate documents into the special provisions.
- Use the Department's standard Pay Items numbers for the project and assign odd pay items numbers provided by the Department only when standard pay item numbers are not applicable after consulting with the Project Manager. Provide detailed specifications for the non-standard items.
- As-Built drawings - Include special provisions in the construction contract that the contractor prepare and provide to the Department in duplicate As-Built drawings and updated contract specifications of the construction project on the soft copies (i.e., CD-Rom, floppy) provided by the consultant.
- Estimates - Prepare detailed construction cost estimates in a format approved by the project manager, in general subdivided as follows:

  - Itemized cost and subtotal for street/highway work, including sidewalks, concrete/steel barriers, street lighting, traffic signal and maintenance of highway traffic and all work associated with the street/roadway, including force account works as directed by the Project Manager.

  - Itemized cost and subtotal for bridge work, including sidewalks, concrete/steel barriers, street lighting and maintenance of highway traffic and all work associated with the bridge and related structures.

- The cost of maintenance of traffic will be divided into costs of individual items that make up the total work.
- Include itemized cost and subtotal of work 100% back-chargeable to private utility companies such as Water and Sewer Authority (WASA), Washington Gas, Telephone Company, PEPCO, and Western Union, etc.

- Final Project Review- Approximately eight weeks prior to P.S & E submission, E-mail or submit thirty sets of half-size rubber-stamp dated plans, thirty double-spaced draft copies of Special Provisions and the Pay Item Schedule, and two copies of estimates (plus soft copies [i.e., CD-Rom, floppy] of the estimates, in Excel) for review and comments when directed. Two sets of plans will be forwarded to FHWA for review and approval. The plans and the contract documents for the final review must be complete in details and scope for construction of the project. Plans will not include Contractor's working drawings for concrete forms or other construction method details nor shop drawings for structural and reinforcing steel. The Pay Item Schedule will not contain subtotal breakdown sections.
- Construction Completion Time Analysis - Submit an analysis demonstrating how the number of days for completion stated in the contract special provisions was determined.
- Corrections - Make corrections to plans, specifications, and estimates as directed and within the time limit to be assigned by DDOT. Deliver to DDOT one complete set of half-size of construction contract drawings; one complete set of the Special Provisions (with appendices) single-spaced typed neatly and Pay Item Schedule typed on 8.5 in. by 11 in. white bond paper; and soft copies (i.e., CD-Rom, floppy) of the Special Provisions and Pay Item Schedule (in Microsoft Word). Format order of Special Provisions and the Pay Item Schedule will conform to format currently in use by the District.
- The Special Provisions, Pay Item Schedule and Cost Estimates will be returned to the Consultant for any necessary modifications. Make the modifications within the time limit as assigned by DDOT and return the Special Provisions, Pay Item Schedule and Cost Estimates to DDOT.

2.3.11.4 Plans, Specifications, & Estimates (PS&E) Submittal

When directed, deliver two complete sets of half-size of plans to FHWA for the PS&E review. DDOT will forward the Special Provisions, Pay Item Schedule and cost estimates to FHWA unless otherwise directed. If further comments result from this review, make the necessary modifications.

2.3.11.5 Final Bid Documents

Upon approval by the District and after appropriate documents have been appended to the Special Provisions by DDOT, provide seventy-five sets of final Special Provisions, Bid Forms, and Appendices; seventy-five sets of half-size final Contract Plans. Print the documents on bond paper and bound and covered in conformance with current DDOT practice. The cover sheet and back sheets of the half-size plans, Special Provisions and Pay Item Schedule will be "green".

Distribute the Contract Plans, Special Provisions, and Appendices to agencies outside of the Reeves Center as directed by DDOT and deliver the remaining sets of Contract Plans, Special Provisions and Appendices to DDOT at the following address: 64 New York Avenue, NE, Washington, DC, 20002

Furnish electronic files of clear, readable design computations and diagrams for all designed portions of the Project and pay item quantity computations. Deliver to the project manager two soft-copies (i.e., CD, floppy) of final contract drawings (in latest version of Microstation) and two soft-copies of final Special Provisions and Pay Item Schedule (in latest version Microsoft Word). One soft-copy set of drawings and one soft-copy set of special provisions will be forwarded to the contractor to prepare As-Built drawings and update specifications of the construction project.

NOTE: Occasionally, the Consultant may be asked to provide full-size drawings on bond paper or vellum for field use.

2.3.12 Quality Assurance/Quality Control Program

2.3.12.1 Quality Assurance/Quality Control Plan

- Develop and submit a Design Quality Assurance/Quality Control (QA/QC) Program to the Program Manager for approval. At the start of the project, discuss the QA/QC plan with the Department's Project Manager. Ensure errors and omissions are minimized, that the contract documents are technically accurate and easily understood, and that all staff members, either from the firm or from affiliated organizations, are aware of the quality assurance program and its implementation.
- Identify the person responsible for the overall Quality Assurance Program for this Contract and the individual responsible for Quality Assurance for each discipline, and correspondingly for Quality Control.

- Perform design analysis and computations in a planned, controlled, and orderly manner; document the findings so that they can be reviewed easily.
- Establish a procedure that will ensure adequate inter-discipline coordination.
- Develop uniform methods for checking and back-checking calculations, designs, drafting and other contract document elements without reliance on review and comments from the Department's Project Manager.
- Establish a system of independent checking such that the original designer is at no time responsible for verifying his own work.
- Develop a flow chart that will show the proposed process of checking, revision, back checking and coordination between the different disciplines.
- Retain and file all marked plans, draft specifications, calculations, review comments, etc. used in the checking process until completion of design.
- Develop a system to ensure that the latest design criteria and standard drawings are being used.
- Ensure that the pay items, quantities and units of measurement are not in contradiction on contract plans, special provisions, pay item schedule and cost estimates.
- Pay Item completeness and estimated reasonable quantities.
- Specifications for non- standard items, special provisions format and completeness.
- Plan clarity and completeness of details.
- Conformance with DDOT specifications, guidelines and standards.
- Completeness of dimensions.

2.3.12.2 Quality Assurance Statement:

With each review submittal, the Professional Engineer whose signature and seal will appear on the contract drawings shall submit a statement that states the following:

- The standards, codes and criteria applicable to the design have been observed.
- The Quality Assurance/Quality Control Program has been implemented, and the designs, computations, drawings and other contract elements have been checked thoroughly and back-checked.

2.3.12.3 Documentation

Maintain current Quality Assurance and Quality Control records on approved forms and/or format relative to Quality Assurance and Quality Control operations, activities and checks performed, including the work of joint-venture firms and sub-consultants.

2.4 Preparation of Drawings

2.4.1 Drawings

The designers must provide all necessary information in the drawings for the contractors to understand and build from the proposed design. Do not draw unnecessary repeat of drawings unless it is absolutely necessary. The unnecessary repeat information will cause conflicts when any changes made on the drawings are not carried through on all affected drawings.

2.4.2 Organization Sheets

In order for a project to be properly defined, a consistent and well-organized set of documents is essential. Therefore, the following order of Working Drawings shall be implemented on all projects.

2.4.3 Description and Contents of Drawings

2.4.3.1 Title/Cover Sheet

The cover sheet for all projects shall be prepared on a standard sheet. It shall contain the following Items:

- Show "District of Columbia" at the top middle of the cover sheet. In the second line, show "Department of Transportation", which shall be followed by the title of project in the next line.
- Project Title - The project title shall appear on the cover sheet and in the title block of all sheets. On the cover sheet the project title shall appear in large bold letters in the top middle of the sheet under "Department of Transportation."
- Federal Aid Project Number- It shall always be located under the title of the project.
- Length of Project - Indicate the length of project on the Title Sheet under the project title and the F.A.P. number. Length of project is the length between the limits of the project that incorporates all the required work for a project, including the transition area for Asphalt overlay to meet the existing grades.
- Index of the Drawings - It must show the number and the title for each sheet in the entire set of the project drawings. Exclusive

sheet for the index shall be used, when the number of sheets is too many to put on the cover sheet. The indexing of drawings will be as follows:
- Drawing must be numbered consecutively starting from Sheet No.1, to the last sheet of the project drawings.
- Number and title of drawings indicated in the Index shall match the number and title of drawings in the title block of each sheet. (Crosscheck Index with Plan Sheets.)

- Location Map - It is a Base Map in a suitable scale that shows the vicinity of a project and the access to that project from reference point. It must include the following:
  - A clear readable map having the necessary information and street names.
  - The map shall show the Limits of Project including Stations.
  - The map shall show the North Arrow, Graphic Scale and Scale.
- Traffic Design Data - In the preliminary stages of project design The Traffic Safety and Data Analysis Branch of Traffic Services Administration will provide the necessary information for the Traffic Design Data for the Department's projects. Make necessary studies and calculations, including computing capacity analysis to show the Level of Service (LOS) for the existing condition of roadways. Show how the new design shall improve the LOS, through channeling and enhancing the roadway geometry, and adjusting the signal timing to meet the current standards. Show the design data for the year of construction and the design speed (Not the Posted Speed) as per requirement of street classification correctly on the cover sheet.
- Hydrologic and Hydraulic Data
- Design Factors for Gutter Capacity and Curb Inlet/Scupper Spacing
- Rainfall Design Frequency
- Spread from curb
- Runoff
- Rational design discharge calculation Method:

  Q = Peak Runoff (cfs):
  C = Coefficient of Runoff:
  i = Rainfall Intensity (iph):
  A = Drainage Area:

- Standard Title Block - Standard title block shall be used for all drawings.

2.4.3.2 Standard Symbols and Abbreviations

- Symbols and Abbreviation shall be consistent through all contract documents. For a symbol and/or abbreviation that is not shown in the District of Columbia Manual, applicable standard symbols and/or abbreviations may be used when properly denoted. No symbol/abbreviation other than the industry standards will be used.
- Show all symbols used on drawings in "Standard Symbols Table". Implement the Standard Symbols on all drawings for consistency. Whenever using a new symbol, it must be defined and added to the Standard Symbols Table. Provide symbols for new (proposed) works, different from existing, to differentiate between new and existing.
- Provide Table of Abbreviations, which must include and define all the abbreviations indicated on the project drawings. Use same Abbreviation on all drawings for consistency.

2.4.3.4 General Notes

- General and/or Construction Notes are required for all projects. For roadway projects that include rehabilitation of bridges, General Notes are mandatory.
- General Notes shall include but not limited to the following items: The current Design and construction Specifications, design loads, design method, structural members (Materials & Stresses), structural steel reinforced concrete/and or prestressed concrete, reinforcing/ prestressing steel, reinforcement steel covers, bolts, foundation type and load capacity, maintenance of traffic, protection shield, verification of existing dimensions and elevations, texturing, patching, bonding new concrete to old, drilling holes in concrete and anchor bolts, paint, masonry & stone masonry, utilities, sections (cross-references), horizontal and vertical control datum.

2.4.3.5 Summary of Quantities Table

- Summary of Quantities Table shall incorporate all the pay items for materials and construction activities that required for certain project. The table shall include item numbers, descriptions and quantities.
- Coordinate and cross check Table with Drawings and Specifications, to present all the required pay items. Neglecting to provide the necessary pay items may create costly change orders.
- All Item Numbers in the table shall be selected from the current D.C. Standard Specifications; and the standard Pay Item Index.

Assign a new odd number to the item, when there is a no appropriate number for the type of work in the index. When assigning an odd number, approval of the District's Project Manager must be obtained and a detailed special provision must be written, including method of measurement and payment.

- Descriptions of pay items shall be indicated identical (including the method of measurement and payment) to latest version of the "D.C. Standard Specifications, and Pay Item Index." Any deviation in Description of Item from the index shall not be accepted or considered the same item. In this case the description of item shall be corrected or a new item number shall be used as described above.
- All Quantities shall comply and agree with the drawings. Any indicated item without quantities shall be eliminated.
- Provide complete specifications for all the additional items that are not listed in the current "D.C. Standard Specifications, and Pay Item Index".
- Summary of Quantities Table shall be crosschecked with engineer's estimate items and pay schedule items for completeness.

2.4.3.6 Geometric Layout (including Sketches for Control Points)

- Geometric Layout shall show and/or include the followings:
  - Base Line for main roadway(s) with required data
  - Base Lines for intersecting roadways
  - Traverse Lines with required data
  - Control Points for Baseline(s) and Traverse Lines.
  - Benchmarks
  - Tables showing the necessary geometric data to satisfy all the requirements for a project including, Curve Data, Baseline Control Coordinates Table, Traverse Line Control Coordinates Table, Superelevation Table and Horizontal and Vertical Control Tables.
  - Scale and Graphic Scale on all Plans
  - North Arrow on all Plans.
- Geometrical data for Construction Baseline (PGL) shall include; stations, bearings, horizontal curve data, distances, control point's numbers and coordinates (N. & E.), location of start and end of bridges if any, points of intersecting roads & allies and the angle of intersections. Also, the names of all streets and intersecting streets shall be indicated. A table for Baseline Control Coordinates shall be required to coordinate the data.
- Geometrical data for Traverse Lines shall include; stations, bearings, distances, traverse reference points' numbers and coordinates (N. & E.). Indicate traverse Lines and ties. A table for

Traverse Line Control Coordinates shall be required to coordinate the data.

- Sketch shall be provided for each control point and benchmark, which shows its location, elevation and full description. Tie them with geodetic surveys. Show a title under each sketch indicating the point number and also show the North Arrow.
- Station numbering system for a roadway shall increase in the direction of east or north. In case of having more than one PGL on the same project, do not repeat station numbers.
- Provide a note addressing; "Coordinates are based on MD State Plane and Elevations are based on D.C. Datum."

2.4.3.7 Survey of Existing Conditions

- Topographical Survey or Survey of Existing Conditions drawings, shall be certified by a registered professional engineer, qualified to perform surveying work. Drawings shall be at a scale not less than 1 in. equal to 20 ft. (1in. = 20 ft.) unless special written permission is given to accommodate the site size.
- The area to be surveyed shall include a 50 ft. wide strip minimum beyond the limits of project.
- Survey of the Existing Conditions shall show and/or include the followings:
  - Existing roadway dimensions, orientations, bearings and curve data, for construction baseline, median and for curb and gutter line.
  - Existing location and width of roadways, and ROW for main and intersecting streets.
  - Exist width for, alleys, driveways, circular entrances, sidewalks, ramps, sodded areas and tree spaces. Also, provide required dimensions for the same.
  - The existing contour lines at 5 ft. vertical intervals. (Note: Contour lines may not always be required for normal conditions.)
  - Spot elevations on the PGL and the top and bottom of curb, every 50 ft.
  - Location and elevation of benchmarks and all reference points.
  - The actual location of bridges and bridge approach slabs if any. Indicate bridge numbers and/or names.
  - Location of abutments and structural elements under bridge (if any) shall be indicated in dashed lines.
  - Existing safety appurtenances, i.e., guardrails, impact attenuators, fences, jersey barriers, barricades etc. Show kind, type and number as applicable.
  - Existing walls, retaining walls, copings, steps, and curbs. Provide grade elevations.

- Existing utility lines and storm drain structures, i.e., inlets, gutters, gratings, manholes, vaults etc. Provide rim and invert elevations.
- Existing gas, telephone, power and light lines. Also, indicate poles locations.
- Existing trees, tree spaces, grass areas, etc.
- Scale and Graphic Scale on all Plans
- North Arrow on all Plans.

- Provide a note addressing; "Coordinates are based on Maryland State Plane and Elevations are based on D.C. Datum."
- Label the names of all streets. Make street names bold, to stand out on the drawings.

2.4.3.8 Typical Sections

- Typical Section drawings shall provide all the necessary typical sections, which are required for a complete project. Typical Sections shall cover and present all required roadway sections at critical and transitional locations, where road width and/or cross-slope changes. Stations shall be indicated under each section to show its actual location. A gap between stations shows a missing section at the gap location. Provide existing and new (proposed) sections on the drawings.
- Typical Sections drawings shall provide all the necessary design items, which are required for a complete project. Typical Section Elements are as followings:
  - Pavement types. All materials shall be specified, using the correct name and size, as per the current D.C. Standard Specifications, and Pay Item Index.
  - Lane widths for driving, bicycling, and parking lanes
  - R.O. W. and roadways widths
  - Normal Crown Section, cross slopes and/or superelevations
  - Curbs and gutters; types, materials and dimensions
  - Draining Channels; side slopes
  - Sidewalks; widths, sections and slopes
  - Tree spaces and sodded areas
  - Medians; widths, sections, materials and slopes
  - Shoulders; widths, sections, materials stability
  - Traffic Barriers; roadside barriers, median barriers, bridge railing, crash cushion
  - Frontage Roads and Ramps
  - Typical Section actual location by providing Stations
  - Scale & Graphic Scale on all sections
- Roadway cross slope shall be designed in accordance with AASHTO requirements. Cross Slope for the two lanes adjacent to the crown line should be pitched at the normal minimum slope,

from 1.5 percent to 2 percent maximum, and on each successive pair of lanes or portion thereof outward, the rate may be increased by about .5 to 1 percent. Where three or more lanes are provided in each direction, the maximum pavement cross slope should be limited to 4 percent (current AASHTO Policy on Geometric Design of Highways and Streets).

- Drawings shall show the locations of cross slope change, provide pavement cross slope at each location.
- The crown line shall be always at the edge of the lane. Middle of lane crown line, is unacceptable. In transition areas for shifting the crown location, use minimum slope on both sides of the crown.
- Typical Section drawings shall show the following required dimensions:
- Width and changes in width of all roadway elements at critical locations.
- The thickness of pavement materials and soil base.
- Steel reinforcement; the reinforcement size and the minimum concrete rebar cover.
- All dimensions and thickness for sidewalks, curbs and gutters.

NOTE: All typical section sheets shall include the following note: "Proof rolling of the existing road bed soils will be required prior to replacement of the soils base materials. Unstable roadbed soils detected during proof rolling shall be removed and replaced with approved soils base material. The depth of the undercut shall be determined in the field at the time of construction. The soils base material shall be compacted to 95 percent of the maximum dry density as determined by **AASHTO T-180 method D**".

2.4.3.9 Paving and Grading Plans

- Paving and Grading Plans shall show all geometric changes and determine if these changes are warranted to alleviate potential safety or operations problems. All changes shall satisfy AASHTO requirements for Sight Distance and for Vertical and Horizontal Alignment.
- Paving and Grading Plans include the following Elements:
  - Limits of Project and the Limits of Total Removal. Drawings; Define their actual locations by Stations.
  - A transition area between the Limits of Total Removal and the Begin and End of Project shall be presented for Asphalt overlay, where mill and resurfacing works shall take place to meet existing grades.
  - The roadway areas that receive new pavement and the required types of pavement

- The start and end of new curb and gutter, specifying types and materials for curb and gutter and pattern for brick gutters. Provide curb returns radii.
- Final roadway geometry including, cul-de-sac radii, dimensions, bearings and curve data, for construction baseline, median, ROW and curb and gutter line.
- The widths of ROW and roadways, for main and intersecting streets.
- The geometry and width of medians: specify types and materials and indicate new works.
- Final geometry and width of alleys, driveways, circular entrances, sidewalks, ramps, sodded areas and tree spaces. Also, provide required dimensions and curb returns radii.
- The angle between the centerline of main roadway and the intersecting streets, alleys and driveways
- The existing and final contour lines at 5 ft. vertical intervals when directed by the District's Project Manager.
- Spot elevations on the PGL and at the top and bottom of curb every 50 ft. and at critical locations such as at change of slopes, joints locations etc.
- Location and data for vertical curves.
- Location of cross slope transitions and at each location show pavement cross slopes
- Location and elevation of benchmarks, all reference points and traverse control points.
- Location and geometry of curb ramps.
- The actual location of bridges and bridge approach slabs if any. Indicate bridge numbers and/or names.
- Location of abutments and structural elements under bridge (if any) shall be indicated in dashed lines.
- Safety appurtenances i.e., guardrails, impact attenuators, fences, jersey barriers, barricades, etc. Show details, kind, type and number as applicable.
- New and existing walls, retaining walls, copings, steps, curbs (Provide grades and elevations.)
- Final location of drains and catch basins
- Final location of trees, tree spaces, grass areas, etc.
- Scale & Graphic Scale on all Plans
- **NORTH ARROW ON ALL PLANS**
- Provide locations of cross slope changes and transitions. At each location provide designated slopes.
- Plans shall show the names of all streets, indicating street names in bold lettering, to stand out on the drawings.

2.4.3.10 Roadway Profiles

For the Roadway Baselines (PGL) and for the Top of Curbs, Roadway Profiles shall include the following Elements:

- Existing and final Roadway Profiles
- Existing and final roadway grades
- A transition area, between the Limits of Total Removal and the Begin and End of Project shall be indicated on profiles, for asphalt overlay to meet the existing grades, where mill and resurfacing works shall take place.
- Vertical Curve Data (Provide table)
- Profile Slopes
- Location of bridges
- Existing and final top of curb Profiles for Right and Left Curbs
- Scale & Graphic Scale (Horizontal & Vertical)
- Grades on Profiles shall be coordinated to match all indicated spot elevations on - Existing Conditions Plans and on Pavement Plans.
- Profiles shall be coordinated with Cross Section Drawings, to resolve problems created from changing the roadway elevations.
- Show the drainage path and direction of the roadway and the sidewalk.

2.4.3.11 Cross Sections

- Provide Cross-section at 50 ft. intervals of roadway project length. Stations shall be indicated under each section to show its actual location. Drawings shall indicate existing and new (proposed) section together on the same drawing for comparing changes in geometry and grades.
- Cross Section Elements are as followings:
  - Existing and final Roadway Cross sections and crown location
  - Existing and final roadway grades and slopes
  - ROW and roadways widths
  - Curbs and gutters showing the above of curb grade
  - Median width and grades
  - Sidewalks
  - Shoulders and retaining walls,
  - Traffic Barriers; roadside barriers, median barriers, bridge railing
  - Frontage Roads and Ramps
  - Stations to show the actual location of Section
  - Scale & Graphic Scale

2.4.3.12 Roadway Intersection Details

- Roadway Intersection Details are required for Portland Cement Concrete (PCC) Pavement only. Drawings shall include roadway

intersection detailed plan indicating design plan for different types of joints on PCC Base and/or Reinforced PCC Pavement with Welded Wire Fabric.

- Details shall include the following elements:
  - Roadway intersection detailed plan indicating stations and dimensions
  - Layout indicating different types of joints
  - ROW and roadways widths
  - Dimensions of each slab including; lengths, widths and lengths of skewed sides
  - Slope of slab sides in two directions
  - Final spot elevation at each corner of the slab.
  - Curbs and gutters showing the above of curb grade
  - Final locations of catch basins
  - Scale and Graphic Scale on all Plans
  - North Arrow on all Plans
  - Delineate different types of joints including; transverse expansion joint, transverse contraction joint, longitudinal contraction joint, and longitudinal construction joints.
  - Indicate lane width and location of crown line, where longitudinal joints to be located.

  Scale of Roadway Intersection Detail shall be 1 in. = 10 ft. or larger.

2.4.3.13 Paving Details

Paving Details shall be as per current Department's standard details, including the following elements; Typical Joint details and layout, detail for alleys and driveway and sidewalk entrances and shall be shown on the full scale drawing plans.

2.4.3.14 Miscellaneous Details

Miscellaneous Details drawings shall provide all the necessary details that are required for a complete project meeting the Department's current design criteria and standards. Details shall include but not limited to the following; Curbs, directional islands, medians, wheelchair/Bicycle Ramps (curb ramps), Walls & Retaining walls, Steps & Leads, Copings, Handrails, Guide Rails, Fencing, Bench Marks, Traffic Poles, Breakaway Sign posts, Metal Sign Posts and Attenuators and shall be shown on the full scale drawing plans.

2.4.3.15 Utility Plans

The utility plans should show all surface and subsurface utility information on plans. This information shall include:

- ROW
- Sidewalks
- Curbs, Curb ramps
- Trees, Hydrants
- Signals, Signs
- Electrical conduits
- Communication lines
- Sewer and Waterlines
- Inlets, manholes and valves
- Scale
- North Arrow

2.4.3.16 Landscape and Planting Plans

The landscape and planting plan shall show:

- ROW
- Sidewalks, Curbs, Ramps, Tree Lawn
- Trees, Plantings (Existing)
- Trees, Plantings (Proposed)
- Irrigation
- North Arrow
- Scale

2.4.3.17 Pavement Marking Plans

The pavement marking plans should include existing and proposed markings and the following information:

- Widths of all cross-section elements on the main and adjacent streets, including widths of travel lanes, parking lanes, bicycle lanes and crosswalk widths and any raised or marked medians and/or raised islands.
- Identify all existing pavement markings on the project-street and at least 100 ft. in each direction of intersecting streets.
- Identify all existing corner radii and the location of handicapped ramps and locations where ramps need to be added.
- Handicapped ramps are required for each pedestrian travel direction. Verify ramps are within the crosswalks.
- Indicate all markings including cross walks, stop bars, lane lines and centerline striping.
- For each intersection, indicate the location of all 2 ft. long traffic guidelines.
- Indicate the radius of all left and right turning lane swing lines.

- Indicate direction of each street and all existing signs.
- Indicate at each intersection the location of traffic controls, including signals, signs, signal controllers and other similar devices.
- Indicate all driveways and alley widths along contracted streets.
- Show location and size of arrow or word markings.
- North arrow
- Scale

2.4.3.18 Signage Plans:

- Provide a legend for signage to include the following:
  - (Small solid square) = Proposed sign to be installed.
  - (Small circle with cross-hatching) = Existing sign, FADED, DAMAGED and/or MISSING in field. Replace sign.
  - (Large X) = Existing Sign to be Removed.
  - Small triangles = Existing sign to be relocated.

Note: Small white triangle represents existing sign and small solid black triangle represents relocated sign location. Indicate from existing location to new location by using small arrows and the words from and to beside the respective triangle.

- Intersection signage sheets to include the following:
  - Indicate a north arrow and scale.
  - Indicate all intersecting street names and location of city section, such as NW, NE, SW, or SE. Indicate unit or block numbers.
  - All regulatory signs for a motorist should be indicated facing in the direction a motorist would read them in the field. Some of these signs may be indicated upside-down on the plan sheet.
  - Indicate the mounting order of each sign location, especially for one or more signs.
  - Indicate the material requirements for all signposts.
  -Locate all signs mounted on streetlights, traffic signals, wood utility poles, and u-posts on all corners, medians, channeling islands at each intersection adjacent to or within the project.
  - Indicate ROW, curb lines, sidewalk, roadway lines.
- Block signage sheets to include the following:
  - Indicate a north arrow and scale.
  - Note direction of streets.
  - Note the street names at the beginning and ending of each block.
  - Make a block map for each side of the street.
  - Indicate width of street and length of street for each block.
  - Locate all signs mounted on streetlights, traffic signals, wood utility poles, and u-posts on all corners, medians, channeling islands within the block.

- All regulatory signs for a motorist should be indicated facing in the direction a motorist would read them in the field. Some of these signs may be indicated upside-down on the plan sheet.
- Indicate the mounting order of each sign location, especially for one or more signs.
- Indicate the material requirements for all signposts.
- Indicate ROW, curb lines, sidewalk, roadway lines.

2.4.3.19 Street Light Plans

- ROW, Curb line, sidewalks, roadway
- Street light locations plans, elevations and sections of pole
- Pole and luminaries types and attachment details
- Conduit locations
- Locations of all existing and proposed utilities
- Pull Box locations
- PEPCO connection location
- Manholes
- Dimensions for plans, elevations and sections of details
- North arrow
- Scale

2.4.3.20 Traffic Signal Plans

- ROW, Curb line, sidewalks, roadway
- Signal locations plans, elevations and sections of pole
- Controller Locations
- Manhole and Pull Box locations
- PEPCO connection location
- Pole and mast arm types and attachment details
- Conduit locations
- Locations of all existing and proposed utilities
- Location, type and number of traffic signal heads and pedesteal signal heads
- Dimensions
- North arrow
- Scale

2.4.3.21 Storm Sewer Plan

- ROW, Curb line, sidewalks, roadway
- Inlet locations
- Manholes
- Existing Mainline
- Proposed pipeline

- Show locations of all existing and proposed utilities
- On profile show crossings of other utilities
- Delineate type of pipe, inlets and other features
- Delineate invert of all pipes (inlet and outlet)
- Delineate stationing of inlet, pipe slope changes (horizontal/vertical)
- Delineate slopes
- North arrow
- Graphic Scale

2.4.3.22 Structural Plans

- Bridge Plan
- North Arrow
- Scale
- ROW lines
- Baseline and centerlines
- Locations of Bridge Structure from baseline
- Location and Stationing of Waterway or Roadway Crossing from baseline
- Abutment Locations and stationing from baseline
- Pier locations and stationing from baseline
- Retaining wall locations
- Pavement Joints location from baseline
- Profile with Water Elevation (if Appropriate)
- Expansion and fixed Joint Locations from baseline
- Minimum Vertical Clearance
- Bridge Deck and Approach Slab location and stationing from baseline
- Parapet/Railing location from baseline
- Curb-line location from baseline
- Bridge fascia from baseline
- Conduit Locations
- The plan sheet should show the location of borings and log identification number.
- Foundation pile design loadings shall be noted on the plan.
- Profiles of roadway on the bridge and lower roadway.
- Location of bridge-mounted signs.
- Location of subsurface utilities and proposed utilities on the superstructure.
- Hydraulic and hydrologic data shall be noted on plans for waterway structures.

- If a railroad crossing shows existing tracks, profile on tracks, proposed horizontal and vertical clearances and topography along the railroad.
- Where water crossings are involved, horizontal and vertical clearances should be shown. Any special inlet-outlet treatment should be shown.
- Approach roadway showing median, roadway, and shoulder dimensions, and location of guide rail, if any.

2.4.3.23 Bridge Elevation

- Elevation grades of the structure and immediate approaches
- Span lengths
- Skew
- Controlling minimum horizontal and vertical clearances (also show the actual vertical clearance)
- Type of superstructure
- Location of expansion and fixed bearings
- Proposed elevations of bottom of footing shall be indicated together with the original ground line, finished ground line, and assumed rock line (if any)

2.4.3.24 Typical Section of Bridge

- Type, spacing and arrangement of beams
- Widths of median
- Traveled roadway
- Shoulder (or curb offset) and curb or sidewalk
- Type of railing / fence
- Type of parapet
- Cross-slopes or superelevation

2.4.3.25 Superstructure Plans

- North Arrow
- Scale
- Dimensions of Framing plan and beam locations from baseline
- Pier and Abutment Locations from baseline
- Beam Dimensions, elevations and sections
- Beam cambers Diagrams and tables
- Structural member details and dimensions
- Structural Connections and Diaphragm Details and dimensions

2.4.3.26 Bridge Deck Plans

- North Arrow
- Scale
- Bridge Deck plan
- Pavement Joints
- Dimensions of Bridge deck from baseline
- Expansion Joint Locations from baseline
- Parapet/ Railing Locations from baseline
- Deck Elevations
- Pier and Abutment Locations from baseline
- Conduit Locations
- Approach Slab Locations and Stationing from baseline approach slabs plans, elevations and sections
- Staging

2.4.3.27 Bridge Joints plans

- North Arrow
- Scale
- Bridge Expansion Joint Plans, elevations and sections
- Bridge Fixed Joint Plans, elevations and sections
- Details and Dimensions of Joints
- Bridge Joint Details at median, Parapet/ Railing

2.4.3.28 Bridge Abutment Plan

- North Arrow
- Scale
- Abutment cap and footing plans, dimensions and location from baseline
- Abutment elevations and sections including rebars
- Bottom of Footing Elevation
- Abutment pile foundation plan and dimensions from baseline
- Details of Replacements
- Plans of existing Abutments
- Removal Extents
- Load capacity data for abutment foundation
- Beam pedestals on abutment cap will not be allowed. Provide steps in the cap to accommodate change in elevations for the beam shoe pads.

2.4.3.29 Bridge Pier Plans

- North Arrow
- Scale

- Pier cap and footing plans, dimensions and location from baseline
- Pier elevations and sections including rebars
- Bottom of Footing Elevation
- Pier pile foundation plan and dimensions from baseline
- Details of Replacements
- Plans of existing piers
- Removal Extents
- Load capacity data for pier foundation
- Beam pedestals on pier cap will not be allowed. Provide steps to accommodate change in elevations for the beam shoe pads.

2.4.3.30 Retaining wall Plans

- Retaining wall plans
- North Arrow
- Scale
- Retaining wall and footing plan and dimensions from baseline
- Bottom of Footing Elevation
- Retaining wall Elevations and Sections including rebar
- Details of Replacements
- Retaining wall Pile Foundation plan and dimensions from baseline
- Load capacity data for Retaining wall foundation
- Plans of existing retaining walls

2.4.3.31 Bridge Parapet/Railing/Pedestrian Plans

- Railing plan, elevation and sections
- North Arrow
- Scale
- Typical Railing Height and Location
- Connection Details including bolts and welds
- Dimensions
- Architectural treatment details
- Post Spacing
- Post, Joint and Connection Details

2.4.3.32 Bridge Drainage

- Bridge Drainage Plan and scupper/inlet locations
- North Arrow
- Scale
- Typical Scupper/inlet Details
- Drainpipe Connection Details
- Dimensions of Scupper/inlet and size of pipes

2.4.3.33 Traffic Detour and Traffic Control Plan

The traffic control plan should include all phases of construction. For each phase, show the following information:

- Location of ROW, streets, sidewalks, driveways
- North Arrow
- Scale
- All existing signage, pavement marking, signals
- All signage and striping to be removed or covered during construction
- Show all proposed temporary barrels, signs, etc. required from MUTCD and Work Zone Manual.
- Show all dimensions of tapers, type of equipment
- Show work area

2.4.3.34 Traffic Control Plans

The typical traffic control plans will include the following information:

- Schedule of Construction Traffic Control Devices/Tabulation of Traffic Engineering Items
- Construction Signing Plan
- Tabulation of Signs
- Permanent/Existing Signing Plan
- Cross-Sections at Class III and overhead sign locations (if applicable)
- Tabulation of Pavement Markings
- Signal Plan
- List of Standard Special Provisions
- List of Project Special Provisions
- Detailed Sign Layouts

2.4.3.35 Sediment and Erosion Control Plan

These plans are required in each roadway, traffic or structural design project. They should be completed in accordance with the District of Columbia Department of Health, Watershed Protection Division. The typical Sediment and Erosion control plans will include the following information:

- Sediment/Erosion Control Plan (use Roadway base plan)
- Tabulation of Erosion Control Devices
- List of Standard Special Provisions
- Standard Details

- North Arrow
- Scale
- Show all dimensions

2.4.3.36 Soil Boring Logs

The Soil Boring Logs should be incorporated into the plans. The horizontal locations should be delineated in the roadway design plan sheets. The typical Soil Boring Logs control plans will include the following information:

- Location, soils types and depths for each boring

2.5 Required Plans

Stage of Design Process	Number of Copies
Pre-Design Report (When Requested)	5 Copies
Preliminary Design	30 Sets of Stamped Half Size Plans 2 copies of Preliminary Construction Costs
65% Review Design	30 Sets of Stamped Half Size Plans 30 Sets of Special Provisions 2 copies of Preliminary Construction Costs
Final Review Design	30 Sets of Stamped Half Size Plans 30 Sets of Special Provisions (double spaced) 2 copies of Construction Costs and Pay Item Schedule (hard copy and on disk)
PS & E Submittal	2 Sets of Stamped Half Size Plans 2 Sets of Special Provisions 2 Sets of Pay Item Schedule and Cost Estimates
Final Bid Documents	75 Sets of Half Size final Contract Plans 75 Sets of Special Provisions, Bid Forms and Appendices One full size reproducible final contract drawings on tracing linen or tracing plastic and five full size prints Two computer disks of final contract drawings (Microstation latest version) and two disks of final Special Provisions and Pay Item Schedule

NOTE: The number of Final Contract Plans, Special Provisions, Pay Item Schedules and Appendices may be modified by DDOT by written notice to the Consultant.